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INTRODUCTION

Introduction: what are knowledge work practices in education? How can we study and promote them?

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ABSTRACT

New kinds of jobs require managing new kinds of work life competences and a number of such key competences for lifelong learning which equip young people for further learning and employability in a knowledge society have already been identified. Research has however indicated that formal education is not providing adequate support and opportunities for acquiring the needed competencies in practice. More discussion and empirical research is needed about knowledge work competences and related practices in secondary schools, higher education and in the work life. The theme of this special Issue is 'Knowledge work: educational practices preparing students for work life' and it has as its aim to contribute to a discussion on how changes in professional work can be taken into account in educational settings. Of particular interest in this special issue is how educational theory about 'knowledge-creation' is applied in practice. The trialogical approach to learning highlights collaborative knowledge creation and the development of shared, mediating objects. This theory and its associated design principles are introduced. The contributions of this special issue relate to implementing ideas of the trialogical approach to learning in various ways and each contribution is briefly presented.

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Today's students will have to tackle new kinds of jobs which require managing new kinds of work life competences, such as collaborative learning, self-leadership and flexibility besides more traditional teamwork and social skills. Lifelong learning strategies for educational systems have been adopted by many countries (European Union 2010). A number of key competences for lifelong learning which equip young people for adult life and forms a basis for further learning and employability in a knowledge society have been identified. These include competences such as learning to learn, digital competence, effective on-line collaboration, sense of initiative and entrepreneurship (Fontelles and Enestam 2006; Vinagre 2016). However, research has indicated that formal education has not actualised changes to support students in acquiring the needed competences and is

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not providing adequate opportunities for learning to use technologies for collaborative knowledge creation and innovation (Lai 2011).

Policymakers have been concerned that there is much to be done to introduce new ways of organising learning in an innovative educational environment which is more open and relevant to the needs of the labour market and society at large (European Union 2010). The need for new competences is widely adopted at a policy level but this change is not necessarily reflected in the daily classroom activities (Voogt and Roblin 2012).

In the healthcare sector, for instance, the academic-practice gap is well-documented and the academic community has been criticised for producing healthcare personnel who are insufficiently prepared to participate in clinical work and patient care (Prince and Boshuizen 2004; Limb 2017; Huston et al. 2018). The competence gaps do not only relate to clinical reasoning skills but also critical thinking, communication, managing time and responsibilities, and multidisciplinary team working.

Similarly, the literature reports a disparity between the types of skills and knowledge taught in teacher training programmes and the realities of workplace practice (Korthagen 2010). Teachers are reported to experience a 'transition shock' or 'practice shock' once they have left pre-service teacher education and often spending the first year of teaching adjusting to existing practices in the schools. Moreover, a gap exists between what is taught in pre-service courses and how teachers use technology in a real classroom and beginning teachers consequently feel they are not prepared to effectively use technology in their classrooms (Tondeur et al. 2012). Researchers have proposed that teacher education programmes have failed to equip teachers with sufficient training in collaboration skills and in delivering strategies for clarifying roles and building collaborations and, thereby, producing teachers who feel unprepared and inexperienced (Hamilton-Jones and Vail 2014).

The same kind of concerns have been raised in engineering and computer science education. While many universities have recognised the need to assign group projects, explicit attention is seldom paid to help students develop teamwork and project management skills and students rarely receive any specific training on how to function collaboratively before such assignments (Lingard 2010). Little attention is given to how teams are formed, leveraging web-based tools for team collaboration, planning, estimating, tracking progress, nor about what to learn from participating in dysfunctional teams and students, therefore, often develop negative views about the value of teamwork (Lingard 2010; Barkataki and Lingard 2011).

These challenges have not only concerned higher education but also schools. The term '21st century skills' is often used to refer to the skills which have been identified as important for success in the 21st century society. A rapidly changing digital society is seeing significant changes in the workplace and it is understood as placing new demands beyond teaching traditional academic or knowledge-based skills. The 21st century skills can be grouped into three main areas; (1) Learning and innovation skills including e.g., communication, collaboration, creativity and innovation, (2) Digital literacy skills including e.g. information and technology literacy, and (3) Career and life skills including e.g., leadership, initiative and productivity. These skills are then not just for working life but depict knowledge work skills and competences more generally. Other terms for these competences are generic or key or knowledge work competences (Muukkonen et al. 2017).

This special issue has a focus on the theme '*Knowledge work: educational practices preparing students for work life*'. The aim is to contribute to a discussion on how changes in ways of working can be taken into account in educational settings. More discussion and empirical research is needed about the knowledge work competences and related practices in secondary schools, higher education and in the work life. By 'knowledge practices' we mean recurrent activities and learned ways of working with knowledge where knowledge should be understood in the broadest sense including that which is stated explicitly but also tacit or procedural knowledge (Knorr Cetina 2001; Hakkarainen 2009). Practices and competences complement each other in this special issue. Competences are often in focus when conceptualising and measuring skills and dispositions regarding both individual and collaborative knowledge work. This requires the development of novel pedagogical practices by teachers and other relevant actors.

Of particular interest in this special issue is how educational theory about 'knowledge-creation' or 'knowledge-building' is applied in practice. One problem with measuring 21st century skills and competences is that they easily produce a long and generic list of various competences which give a little advice for implementing them in practice. That is why knowledge work competences need to be analysed in specific pedagogical contexts to be further developed.

The cases of this special issue have a focus on the collaborative processes of developing and creating something new together. The *trialogical approach to learning* has been presented in a series of papers and book chapters promoting the kind of learning which involves collaborative knowledge creation and which often relies on the development of shared, mediating objects (Paavola, Lipponen, and Hakkarainen 2004; Paavola and Hakkarainen 2005; Paavola, Engeström, and Hakkarainen 2012). Sfard has previously distinguished between two dominant metaphors of learning that have strongly influenced how learning has been conceptualised in research (Sfard 1998). The first metaphor, the acquisitionist metaphor, describes learning as based on transferable 'knowledge' and on individual processes taking place 'inside' the human mind, separated from the material world and the social and cultural context. The second metaphor, the participation metaphor, instead emphasises the interactive process of participating in various cultural practices. Learning is viewed as being fundamentally situated physically and socially and the focus is on activities, on 'knowing', rather than 'knowledge'. More emphasis is therefore put on social interaction, dialogue, 'enculturation' and 'legitimate peripheral participation'.

While both metaphors may be useful in various contexts, the trialogical approach to learning suggests the need for adding a third metaphor, the knowledge creation metaphor of learning that specifically draws attention to the innovative aspects of learning, i.e., processes of deliberately creating and advancing knowledge. The rapid development of new technology, the complexity of society and the pressure to create – and to learn to create – new knowledge and to transform practices in various areas of life, have had an impact on what theories about learning should focus on (Paavola, Engeström, and Hakkarainen 2012). The trialogical approach to learning does not only have emphasis on individuals or on community, but on the way people deliberately and collaboratively develop mediating artefacts. The third metaphor thus emphasises the collaborative development of shared objects or artefacts and related practices. Characteristic of the trialogical approach to learning is that it concentrates on developing the interaction that is happening *through* these common objects or artefacts, not just between people or

between people and the environment. It focuses on transforming processes where people collaboratively create and develop conceptual or material artefacts or practices for a subsequent use.

A number of common features of different models and theories of innovative knowledge communities were identified in (Paavola, Lipponen, and Hakkarainen 2004) and these were later developed into a set of design principles to characterise the main features of trialogical learning in order to promote the interaction between theory and pedagogical practices, and for the design of related educational technology (Paavola et al. 2011). The design principles are the following:

(1) *Organising activities around shared 'objects'*: the first principle explicates the key idea of emphasising practices through which participants collaborate on developing shared 'objects'. These can be various kinds of artefacts (documents, plans, models, prototypes, etc) but also practices and processes (i.e., ways of working) that are developed together.
(2) *Supporting integration of personal and collective agency and work through developing shared objects*: the dichotomy between individualistic approaches to learning and purely social interaction should be transcended. Participants may e.g., be encouraged to take agency of their own work but also of collaborative processes and the objects that are being developed.
(3) *Emphasising development and creativity in working on shared objects through transformations and reflection*: this principle emphasises how knowledge-creation processes can be supported through interactions and transformation between various forms of knowledge such as explicit knowledge, under-articulated (tacit) knowledge, knowledge practices and conceptualisations.
(4) *Fostering long-term processes of knowledge advancement with shared objects (artefacts and practices)*; as developing something new collaboratively takes time, the focus here is on practices and tools which support work with a longer time frame than is common within a course, such as developing things meant for subsequent use and encouraging links between different courses.
(5) *Promoting cross-fertilisation of various knowledge practices and artefacts across communities and institutions*: creating learning settings which allow learners to solve complex, 'authentic' problems that have relevance outside the educational setting or which enable them to collaborate with external experts and organisations.
(6) *Providing flexible tools for developing artefacts and practices*: this principle highlights how new technologies can enhance the collaborative creation of artefacts and practices by providing means and affordances for e.g., collaboration, sharing, drafting, reusing, reflection and modification.

The design principles were developed in a research project called the Knowledge Practices Laboratory (KP-Lab) which was a five year project (2006–2011) funded by the European Union involving over 20 partners from 14 countries. This project was followed by another project, Promoting Knowledge Work Practices in Education (KNORK, http://knork.info), supported by the Lifelong Learning Programme of the European Union (2014–2016). Many of the contributors to this special issue participated

in either or both of these projects. The papers in this special issue all relate to implementing ideas of the trialogical approach to learning in various ways.

In the first paper, a cross-cultural translation and adaptation of an instrument designed to measure the learning of knowledge-work competence in education is presented (Karlgren et al. 2019). The original version of the *Collaborative Knowledge Practices Questionnaire*, or the CKP (Muukkonen et al. 2019), was based on the knowledge-creation metaphor of learning and validated in Finnish but it has now been translated and validated in English.

In the second paper, Sansone and colleagues investigate how a course on experimental pedagogy at an Italian university inspired by the trialogical learning approach and its six design principles impacted students' perceptions of acquiring knowledge work skills (Sansone et al. 2019). The authors observe that the students in particular reported that they had learned to work collaboratively on shared objects and to use feedback to improve the products.

The third paper by Ilomäki and colleagues, investigates two cases but on the level of upper secondary school and in Finland and Bulgaria (Ilomäki et al. 2019). Their empirical studies focused on the implementation of the design principles in the cases as well as students' self-assessed learning of knowledge work competences and the teachers' and students' experiences. The paper analyzes both the aspects which were appreciated by the teachers and students as well as reported problems. The paper also discussed the possibilities and challenges of the trialogical design principles – these were perceived as useful for the teachers' planning but practical guidelines for implementing the principles were called for.

The fourth paper by Vesikivi and colleagues, investigates the introduction of a curriculum change including the promoting of working life skills and how it influences first year students' retention, study experiences and self-evaluated development of knowledge work competence (Vesikivi et al. 2019). They report that the new curriculum led to improved retention and at the same time students reported learning aspects of collaborative knowledge work competence.

In the last paper, Damşa and Muukkonen focus on the notion of learning with 'shared knowledge objects' and investigate how learning activities with knowledge objects are enacted in two rather different higher education cases (Damşa and Muukkonen 2019). The authors investigate the object-oriented learning and indicators of an object-oriented mindset when the aim is to co-construct an object rather than to merely interact dialogically.

All the contributions further our understanding about how we can study and promote collaborative knowledge creation practices in education by presenting findings from empirical studies as well as by advancing methodological and theoretical discussions about the theme. Nevertheless, the problems associated with the creation of knowledge and the links between using this knowledge in learning contexts and at work deserve further investigation. For instance, how can the created knowledge be evaluated? How can the work that includes both individual and collaborative contributions be assessed? Furthermore, how can bridges between formal education and workplaces be created? How can entrepreneurs willing to share their expertise in an academic context be supported? Are students and teachers ready to incorporate their expertise into the learning programmes? Many other questions can be raised and a further aim of this special issue is precisely to widen the space of reflection and research on the topic. Lina Markauskaite's commentary wraps up this special issue by discussing each contribution and by raising some overarching challenges and questions about learning through knowledge creation (Markauskaite 2019). Her commentary

highlights relevant points, enriches the discussion about learning and suggests paths forward for both educators and researchers in their attempts at fostering knowledge work practices.

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References

Barkataki, S., and R. Lingard. 2011. "Teaching Teamwork in Engineering and Computer Science." In *ASEE/IEEE Frontiers in Education Conference*, Rapid City, SD.

Damşa, C., and H. Muukkonen. 2019. "Conceptualising pedagogical designs for learning through object-oriented collaboration in higher education." *Research Papers in Education* 34 (This issue).

European Union. 2010. "2010 Joint Progress Report of the Council and the Commission on the Implementation of the 'Education and Training 2010 Work Programme'." *Official Journal of the European Union* C 117. 53.

Fontelles, J. B., and J.-E. Enestam. 2006. "Recommendation of the European Parliament and of the Council of 18 December 2006 on Key Competences for Lifelong Learning." *Official Journal of the European Union* 49 (L 394): 10–18.

Hakkarainen, K. 2009. "A Knowledge-practice Perspective on Technology-mediated Learning." *International Journal of Computer-Supported Collaborative Learning* 4 (2): 213–231. doi:10.1007/s11412-009-9064-x.

Hamilton-Jones, B. M., and C. O. Vail. 2014. "Preparing Special Educators for Collaboration in the Classroom: Pre-service Teachers' Beliefs and Perspectives." *International Journal of Special Education* 29 (1): 76–86.

Huston, C., B. Phillips, P. Jeffries, C. Todero, J. Rich, P. Knecht, S. Sommer, and M. Lewis. 2018. "The Academic-practice Gap: Strategies for an Enduring Problem." *Nursing Forum* 53 (1): 27–34.

Ilomäki, L., S. Stefanova, and T. Vasileva. 2019. "Promoting Knowledge Practices in Upper Secondary Schools: Case Studies from Finland and Bulgaria." *Research Papers in Education* 34 (This issue).

Karlgren, K., M. Lakkala, A. Toom, L. Ilomäki, P. Lahti-Nuuttila and H. Muukkonen (2019). "Assessing the learning of knowledge work competence in higher education – cross-cultural translation and adaptation of the Collaborative Knowledge Practices Questionnaire." *Research Papers in Education* 34 (this issue).

Knorr Cetina, K. 2001. "Objectual Practice." In *The Practice Turn in Contemporary Theory*, edited by T. R. Schatzki, K. Knorr Cetina, and E. von Savigny, 184–197. London and NY: Routledge.

Korthagen, F. A. 2010. "How Teacher Education Can Make a Difference." *Journal of Education for Teaching* 36 (4): 407–423. doi:10.1080/02607476.2010.513854.

Lai, K.-W. 2011. "Digital Technology and the Culture of Teaching and Learning in Higher Education. In Hong, K. S. & Lai, K. W. (eds), ICT for Accessible, Effective and Efficient Higher Education: Experiences of Southeast Asia." *Australasian Journal of Educational Technology* 27 (Special issue 8): 1263–1275.

Limb, M. 2017. "Newly Qualified Doctors are Underprepared, Study Suggests." *BMJ* 356: j593. doi:10.1136/bmj.j593.

Lingard, R. W. 2010. "Teaching and Assessing Teamwork Skills in Engineering and Computer Science." *Journal of Systemics, Cybernetics and Informatics* 18 (1): 34–37.

Markauskaite, L. (2019). "Commentary: Learning for knowledge work practices in the wild." Research Papers in Education 34 (This issue).

Muukkonen, H., M. Lakkala, A. Toom, and L. Ilomäki. 2017. "Assessment of Competences in Knowledge Work and Object-bound Collaboration during Higher Education Courses." In *Higher Education Transitions: Theory and Research*, edited by E. Kyndt, V. Donche, K. Trigwell, and S. Lindblom-Ylänne, 288–305. London: Routledge.

Muukkonen, H., M. Lakkala, P. Lahti-Nuuttila, L. Ilomäki, K. Karlgren, and A. Toom. 2019. "Assessing the Development of Collaborative Knowledge Work Competence: Scales for Higher Education Course Contexts." *Scandinavian Journal of Educational Research* 1–19. doi:10.1080/00313831.2019.1647284.

Paavola, S., R. Engeström, and K. Hakkarainen. 2012. "The Trialogical Approach as a New Form of Mediation." In *Collaborative Knowledge Creation: Practices, Tools, and Concepts*, edited by A. Moen, A. I. Mørch, and S. Paavola, 1–14. Oslo: Sense.

Paavola, S., and K. Hakkarainen. 2005. "The Knowledge Creation Metaphor – An Emergent Epistemological Approach to Learning." *Science & Education* 14 (6): 535–557. doi:10.1007/s11191-004-5157-0.

Paavola, S., L. Lipponen, and K. Hakkarainen. 2004. "Models of Innovative Knowledge Communities and Three Metaphors of Learning." *Review of Educational Research* 74 (4): 557–576. doi:10.3102/00346543074004557.

Paavola, S., M. Lakkala, H. Muukkonen, K. Kosonen, and K. Karlgren. 2011. "The Roles and Uses of Design Principles for Developing the Trialogical Approach on Learning." *Research in Learning Technology* 19 (3): 233–246. doi:10.3402/rlt.v19i3.17112.

Prince, K. J. A. H., and H. P. A. Boshuizen. 2004. "From Theory to Practice in Medical Education - Effect on Knowledge Application, Clinical Reasoning and Learning." In *Professional Learning: Gaps and Transitions on the Way from Novice to Expert*, edited by H. P. A. Boshuizen, R. Bromme, and H. Gruber, Innovation and Change in Professional Education, Vol. 2, 121–139. Dordrecht: Springer.

Sansone, N., D. Cesareni, I. Bortolotti, and M. B. Ligorio. 2019. "Developing Knowledge Work Skills in a University Course." *Research Papers in Education* 34 (This issue).

Sfard, A. 1998. "On Two Metaphors for Learning and the Dangers of Choosing Just One." *Educational Researcher* 27 (2): 4–13. doi:10.3102/0013189X027002004.

Tondeur, J., J. Van Braak, G. Sang, J. Voogt, P. Fisser, and A. Ottenbreit-Leftwich. 2012. "Preparing Pre-service Teachers to Integrate Technology in Education: A Synthesis of Qualitative Evidence." *Computers & Education* 59 (1): 134–144. doi:10.1016/j.compedu.2011.10.009.

Vesikivi, P., M. Lakkala, J. Holvikivi, and H. Muukkonen. 2019. "The Impact of a Project-Based Learning Curriculum on First-Year Retention, Study Experiences, and Knowledge Work Competence." *Research Papers in Education* 34 (This issue).

Vinagre, M. 2016. "Developing Key Competences for Life-long Learning through Virtual Collaboration: Teaching ICT in English as a Medium of Instruction." In *Handbook of Research on Foreign Language Education in the Digital Age*, edited by C. Wang and L. Winstead, 170–187. Hershey, PA: IGI Global.

Voogt, J., and N. P. Roblin. 2012. "A Comparative Analysis of International Frameworks for 21st Century Competences: Implications for National Curriculum Policies." *Journal of Curriculum Studies* 44 (3): 299–321. doi:10.1080/00220272.2012.668938.